REMARKS

The Applicants sincerely appreciate the Examiner's thorough examination of the present application as evidenced by the Office Action of April 28, 2006 ("the Office Action"). In particular, the Applicants appreciate the Examiner's indication that Claims 8-11, 15-25, 27-29, and 77-94 are allowed. In response, the Applicants have canceled Claims 26, 33, 68, and 69 to reduce issues for further consideration. The Applicants will also show in the following remarks that all pending claims are patentable over the cited art. Accordingly, the Applicants respectfully submit that all claims are in condition for allowance, and a Notice of Allowance is requested in due course.

Claim 7 Is Patentable Over Hornberger

Claim 7 has been rejected under 35 U.S.C. Sec. 102(b) as being anticipated by U.S. Patent No. 3,497,774 to Hornberger *et al.* ("Hornberger"). The Applicants respectfully submit, however, that Claim 7 is patentable over Hornberger for at least the reasons discussed below. In particular, Claim 7 recites a method of bonding two components including:

> positioning the two components relative to one another to obtain a desired orientation; and
>
> bonding the two components in the desired orientation with metal wherein a temperature of both components is maintained below a melting temperature of the metal while bonding;
>
> wherein bonding comprises providing particles of the metal on the two components and bonding the metal particles;
>
> wherein each of the particles of the metal comprises a dielectric material coated with the metal before bonding the two components. (Emphasis added.)

The Applicants respectfully submit that Hornberger fails to teach or suggest a dielectric material coated with a metal before bonding. As discussed in Hornberger:

> The cermet material is best applied as a paste which comprises a homogeneous mixture of noble metal particles and glass or vitreous enamel particles mixed with a volatile liquid carrier. (Emphasis added.)

Hornberger, col. 3, lines 60-63. The Applicants submit that a mixture of noble metal particles and glass or enamel particles fails to teach or suggest a dielectric material coated with a metal before bonding.

Accordingly, the Applicants respectfully submit that Claim 7 is patentable over the cited art. In addition, dependent Claims 73 and 74 are patentable at least as per the patentability of Claim 7 from which they depend.

Claim 1 Is Patentable Over The Combination Of Minetti and Avery

Claim 1 has been rejected under 35 U.S.C. Sec. 103(a) as being unpatentable over U.S. Patent No. 4,332,341 to Minetti in view of U.S. Patent No. 6,340,113 to Avery et al. ("Avery"). The Applicants respectfully submit that Claim 1 is patentable over the combination of Minetti and Avery for at least the reasons discussed below.

In particular, Claim 1 recites a method of bonding two components. The method of Claim 1 includes:

> positioning the two components relative to one another to obtain a desired orientation; and
>
> after positioning the two components, bonding the two components in the desired orientation with metal wherein a temperature of both components is maintained below a melting temperature of the metal while bonding wherein bonding comprises plating the metal on the two positioned components. (Emphasis added.)

The Office Action concedes that "Minetti does not expressely teach bonding comprising plating the metal between the two positioned components." (The Office Action, page 4.) In support of the rejection, the Office Action further states that:

> However Avery et al. teaches a method of low temperature joining of electronic components wherein bonding comprises electroplating or electroless plating of the bimetallic particles on the two positioned components in order to produce a uniform coating. (see column 4, lines 16-53 and figure 3).

The Office Action, page 4.

The Applicants respectfully submit that Avery fails to teach or suggest plating metal on two positioned components after positioning the two components. As discussed by Avery:

> Various techniques ... can be used to form the coated, bimetallic particles of the invention, including for example, plating techniques.

Avery, col. 4, lines 28-30. In addition, Avery states that:

> Tin-coated particles ... were prepared by coating lead in a standard commercial electroless tin plating solution. ... The particles had to be vigorously agitated while in

> the plating solution in order that each particle was uniformly coated and that they did not bond together. (Underline added.)

Avery, col. 9, line 66 to col. 10, line 15. Plating of Avery is used to form bimetallic particles in a standard plating solution, and agitation is used to provide that the particles do not bond together during plating. Moreover, as shown in Figures 3-5, the solder composition 10 is applied to the substrate 32 before electronic components 42 and 44 are connected to the solder composition/substrate 10/32. *See*, Avery, col. 8, lines 8-64. Accordingly, Avery fails to teach or suggest bonding comprising plating metal on two positioned components.

As discussed with respect to Figures 3-5 of Avery, the solder composition is applied to substrate 32 separate from components 42 and 44. Moreover, the solder composition is not plated on the substrate 32 or components 42 or 44. As discussed by Avery:

> The solder composition can be injected into the wells, stamped into the wells or simply applied to the surface of the substrate 32 (with the excess solder composition being subsequently brushed away). ... (It should also be clear that the solder composition need not be deposited within wells. In an alternative embodiment, the solder composition ... can simply be prebumped upon selected regions of circuit array.)

Avery, col. 8, lines 18-28. Avery thus fails to teach or suggest plating metal on a single component, much less, plating metal on two positioned components.

Avery also fails to teach or suggest bonding with metal wherein a temperature of both components is maintained below a melting temperature of the metal while bonding. As discussed in Avery:

> Upon joining and heating of the assembly, the metal contacts of the substrate 32 and components 42, 44 are joined by the partial melting and fusion of the bimetallic solder ball 54. Once the composition attains the melting point, the particles are interconnected by a thin eutectic temperature liquid film. (Underline added.)

Avery, col. 8, line 61 to col. 9, line 2. Accordingly, Avery fails to teach or suggest bonding with a metal wherein a temperature of both components is maintained below a melting temperature of the metal while bonding.

None of the cited references taken alone or in combination, teaches or suggests plating metal on two positioned components. The Applicants thus submit that Claim 1 is patentable

over the cited art. The Applicants further submit that dependent Claims 2-4, 30-32, and 70 are patentable at least as per the patentability of Claim 1 from which they depend.

Claim 5 Is Patentable Over The Combination Of Hornberger and Minetti

Claim 5 has been rejected under 35 U.S.C. Sec. 103(a) as being unpatentable over Hornberger in view of Minetti. The Applicants respectfully submit, however, that Claim 5 is patentable over the combination of Hornberger and Minetti for at least the reasons discussed below.

In particular, Claim 5 recites a method of bonding two components. The method includes:

> positioning the two components relative to one another to obtain a desired orientation; and
>
> bonding the two components in the desired orientation with metal wherein a temperature of both components is maintained below a melting temperature of the metal while bonding wherein bonding comprises providing an electrophoretic coating on the two components wherein the electrophoretic coating comprises the metal and dielectric particles. (Emphasis added.)

The Applicants respectfully submit that the combination of Hornberger and Minetti fails to teach or suggest providing an electrophoretic coating on two components. As discussed in the Application as originally filed:

> When using electrophoretic plating, the plating solution includes dielectric particles in addition to the plating metal. Like electroplating, the plating solution is applied to the metallized surfaces of the substrate and the optical fiber, and an anode is provided in contact with the plating solution opposite the substrate. As with electroplating, plating metal from the solution can be deposited on the metallized surfaces of the substrate and the optical fiber by applying an electrical potential between the anode and the metallized surfaces. In electrophoretic plating, the dielectric particles in the plating solution can also be incorporated in the metal layer 35 to increase a deposition thickness and/or deposition rate of the metal layer.

Application, page 4, lines 17-26.

Hornberger discusses applying a paste "which comprises a homogeneous mixture of noble metal particles and glass or vitreous enamel particles" (Hornberger, col. 3, lines 60-63), and Minetti discusses "bonding solid solder performs to contact members of an electronic component" (Minetti, col. 2, lines 5-6). Neither of these references (taken alone or in

combination) teaches or suggests providing an electrophoretic coating on two components. Moreover, the Office Action does not point to any portion of either Hornberger or Minetti as teaching or suggesting providing an electrophoretic coating on two components.

The Applicants thus submit that Claim 5 is patentable over the combination of Hornberger and Minetti. In addition, dependent Claims 71 and 72 are patentable at least as per the patentability of Claim 5 from which they depend.

Claim 12 Is Patentable Over The Combination Of Hornberger and Minetti

Claim 12 has been rejected under 35 U.S.C. Sec. 103(a) as being unpatentable over Hornberger in view of Minetti. The Applicants respectfully submit that Claim 12 is patentable over the combination of Hornberger and Minetti for at least the reasons discussed below.

In particular, Claim 12 recites a method of bonding two components. The method includes:

> positioning the two components relative to one another to obtain a desired orientation; and
>
> bonding the two components in the desired orientation with metal wherein a temperature of both components is maintained below a melting temperature of the metal while bonding;
>
> wherein bonding comprises providing particles of the metal with a dielectric coating thereon on the two components and bonding the metal particles;
>
> wherein bonding the metal particles includes rupturing the dielectric coatings by passing an electric current through the particles. (Emphasis added.)

The Applicants respectfully submit that the combination of Hornberger and Minetti fails to teach or suggest providing particles of a metal with a dielectric coating thereon. In support of the rejection, the Office Action states that:

> Hornberger et al. teaches a method of bonding two components ... wherein the particles of the metal comprises a glass (dielectric material) coated with the metal before bonding the two components (see column 1 line, 13 – column 4, line 75).
>
> Hornberger et al. does not teach a method of bonding wherein at least one of the two components comprises a micro-electronic component, and optical component and/or a micro-mechanial component.
>
> However Minetti wherein a first one of the components comprises a substrate and wherein a second one of the components comprises one of a micro-electronic component, an optical component or a micro-mechanical component (Figure 5 and abstract).

Office Action, pages 4-5.

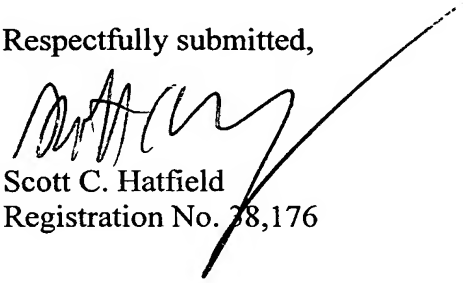
The Office Action, however, does not point out any portion of either of Hornberger or Minetti as teaching or suggesting particles of a metal with a dielectric coating thereon and/or rupturing the dielectric coatings, much less rupturing the dielectric coatings by passing an electric current through the particles. Even accepting the characterization of Hornberger set forth in the Office Action for the sake of argument, the Office Action asserts that Hornberger teaches "glass (dielectric material) coated with the metal" which is the opposite of a particles of a metal with a dielectric coating thereon as recited in Claim 12. As discussed above with respect to Claim 7, Hornberger actually discusses a mixture of noble metal particles and glass or enamel particles. Accordingly, Hornberger and Minetti, taken alone or in combination, fail to teach or suggest particles of a metal with a dielectric coating thereon. Hornberger and Minetti also fail to teach or suggest rupturing the dielectric coatings by passing an electric current through the particles.

For at least the reasons discussed above, the Applicants respectfully submit that Claim 12 is patentable over the cited art. The Applicants further submit that dependent Claims 75 and 76 are patentable at least as per the patentability of Claim 12 from which they depend.

CONCLUSION

Accordingly, the Applicants submit that all pending claims in the present application are in condition for allowance, and a Notice of Allowance is respectfully requested in due course. The Examiner is encouraged to contact the undersigned attorney by telephone should any additional issues need to be addressed.

Respectfully submitted,



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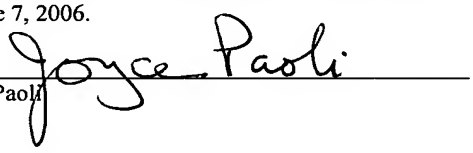

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